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EXAMINER	
CHANG, EDITH M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/627,571	Applicant(s) LIANG, HAIXIANG	
	Examiner Edith M Chang	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 July 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3-6*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. If a copy of a provisional application listed on the bottom portion of the accompanying Notice of References Cited (PTO-892) form is not included with this Office action and the PTO-892 has been annotated to indicate that the copy was not readily available, it is because the copy could not be readily obtained when the Office action was mailed. Should applicant desire a copy of such a provisional application, applicant should promptly request the copy from the Office of Public Records (OPR) in accordance with 37 CFR 1.14(a)(1)(iv), paying the required fee under 37 CFR 1.19(b)(1). If a copy is ordered from OPR, the shortened statutory period for reply to this Office action will not be reset under MPEP § 710.06 unless applicant can demonstrate a substantial delay by the Office in fulfilling the order for the copy of the provisional application. Where the applicant has been notified on the PTO-892 that a copy of the provisional application is not readily available, the provision of MPEP § 707.05(a) that a copy of the cited reference will be automatically furnished without charge does not apply.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "impairment compensator" in claims 20 and 22; "means for organizing a received sequence of symbol estimates into N phases", "means for grouping the N phases...", and "means for selecting constellation points" in claim 25; "means for selecting candidate next constellation ...", and "means for assigning successive lowest power ones ..." in claim 16; and "one computer readable medium selected

from the set of a disk, tape or other magnetic, optical, or electronic storage medium and..., wireless or ..." in claim 28, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The "a highest power one of the next lowest power constellation points" is not described in the specification to teach how to determine/enable "a highest power one of the next lowest power constellation points".

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "such group". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-4, 7, 9-10, 13-17, 19, & 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Okunev et al. (US 6272171 B1).

Regarding **claims 1-4**, Okunev et al. discloses a method comprising: grouping phase intervals based on similarity of aggregated impairment and calculating a characteristic set of symbol estimates (column 2 line 60-colmn 3 line 10, where the phase intervals are the slots, aggregated impairment is such as RBS, signal levels is the symbol estimates); and assigning constellation points for a constellation index based on one or more characteristic sets (column 3 lines 35-40, column 5 lines 53-65); performing the assigning for each J distinct constellation indices selecting successive candidate next constellation points that, based on symbol estimates, satisfy a distance metric, and assigning lowest power ones (FIG.8a,FIG.8b, column 18 line 35-column 19 line25, column 21 lines 60-65). Clearly in the Abstract, Summary of the invention, FIG.8 and the descriptions of the figures, Okunev et al. discloses the inventions of claims 1-4 wherein grouping phase intervals and calculating symbol estimates (column 2 line60-column 3

line 10), and assigning optimal constellation points based on the DIL received by distance metric, then power limitation (column 5 lines 53-65).

Regarding **claim 7**, Okunev et al. discloses a single phase interval corresponds to each constellation index (column 18 lines 34-36).

Regarding **claim 9**, Okunev et al. discloses performing the grouping based on a received impairment compensation sequence that places at least one instance of each symbol in each of the phase intervals (column 3 lines 1-10).

Regarding **claim 10**, Okunev et al. discloses communicating the constellation points to a remote communications device (column 2 lines 10-20).

Regarding **claims 13-17, & 19**, Okunev et al. discloses method comprising: receiving a sequence of symbol estimates organized into N phases (column 2 line 60-column 3 line10, column 3 lines 53 where i is equivalent to N), one or more of the phases corresponding to each of J constellation indices (FIG.1b); grouping the N phases into a set of groups according to aggregated effects of the periodic impairment (column 2 line 60-column 3 line10), and selecting constellation points based on the groups (column 5 lines 53-67); selecting constellation points satisfy a distance metric, assigning lowest power ones; selecting for constellation, one of the next lowest power constellation points for which the distance metric exceeds a minimum distance metric; and adding a particular constellation (866-876 FIG.8c); and each constellation (K=1,..6, where the K is J) is associated with a single group (860 FIG.8c), and the constellation point selecting to this index including selecting a next lowest power constellation point for which a distance metric exceeds a minimum distance metric (column 5 lines 60-67, FIG.8b). Clearly in the Abstract, Summary of the invention, FIG.8 and the descriptions of the figures, Okunev et al.

discloses the inventions of claims 1-4 wherein grouping phase intervals and calculating symbol estimates (column 2 line60-column 3 line 10), and assigning optimal constellation points based on the DIL received by distance metric, then power limitation (column 5 lines 53-65).

Regarding **claim 27**, Okunev et al. discloses a computer program product (column 22 lines 60-65, all flow charts are for the instructions) of the modem comprising the subject matter claimed (refer to rationale of claim 13).

7. Claims 1, 13, 20, 25, & 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Davis et al. (US 6661847 B1).

Regarding **claim 1**, Davis et al. discloses the method (FIG.3) comprising: grouping phase intervals based on similarity of aggregate impairment and calculating a characteristic set of symbol estimates (column 6 lines 30-40, column 6 line 65-column 7 line 2, column 7 lines 10-20, lines 41-46), and assigning constellation points for one or more characteristic sets (column 6 line 65-column 7 line 2). Clearly in the Abstract, Summary of the invention, FIG.3 and the descriptions of the figures, David et al. discloses the invention.

Regarding **claim 13**, Davis et al. discloses the method comprising: receiving a sequence of symbol estimates organized into N phases (column 7 lines 10-20, where the interval i is the phases), grouping the N phases into a set of characteristic groups (column 7 lines 45-67), and for each of the constellation, selecting constellation points based on the characteristic groups (column 8 lines 5-65).

Regarding **claims 20 & 25**, Davis et al. discloses the communication device (column 10 lines 35-40, FIG.1) comprising: a receive path/means for (10-60 FIG.1), and an impairment

compensator/means for organizing a received sequence of symbol estimates, /for grouping, /for constellation (column 6 lines 10-20, 60 FIG.1).

Regarding **claim 27**, Davis et al. discloses a computer program product comprising: instructions to execute the method (column 6 lies 5-20, column 10 lines 35-67, column 16 lines 40-60).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 5-6, 8, 11-12, & 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okunev et al. (US 6272171 B1) in view of David et al. (US 6661847 B1).

Regarding **claims 5 & 6**, Okunev et al. teaches PCM modem frame (six slots) but does not explicitly specify a k^{th} one of the phase intervals, a $(k+6)^{th}$, a $(k+12)^{th}$, and a $(k+18)^{th}$ intervals. However Davis et al. teaches for each of a 6T frame/of the 6 intervals in constellation generation (column 2 lines 15-20, column 7 lines 10-15) that includes +6, + 12, and + 18. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Davis et al.'s teaching in Okunev et al.'s optimal constellation method to map represented by digital impairment parameters between transmitted ucodes and received signal levels to select a set of signal constellations for downstream data transmission (column 3 lines 27-30).

Regarding **claims 8 & 18**, Okunev et al. discloses the constellation index is one of six constellations (FIG.1b, column 6 lines 6-7), but does not explicitly specify the phase intervals number twenty-four. However Davis et al. teaches for each of the 6 intervals in constellation generation (column 7 lines 10-15) that includes +24. As Okunev et al. teaches PCM modem frame (six slots), at the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Davis et al.'s teaching in Okunev et al.'s optimal constellation method to map represented by digital impairment parameters between transmitted ucodes and received signal levels to improve the selecting a set of signal constellations for downstream data (column 3 lines 27-30) for the PCM modem.

Regarding **claims 11 & 12**, Okunev et al. discloses the symbol estimates including amplitude estimates (column 1 lines 60-62, column 2 lines 6-21, wherein the Ucodes used as the standard), but does not explicitly specify the Ucode in estimates (which is part of the standard). However Davis et al. teaches the estimates and distance metric corresponding to the Ucodes (Abstract, FIG.3, column 7 lines 42-45). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Davis et al.'s teaching in Okunev et al.'s optimal constellation method to accommodate the standard and to determine the range of available and usable ucodes and an initial minimum spacing between signal levels (column 3 lines 65).

10. Claims 20-23, 25-26, & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okunev et al. (US 6272171 B1) in view of Krishnan et al. (US 6301296 B1).

Regarding **claims 20-21, 23 & 25-26**, except enlist the elements of the device/apparatus, Okunev et al. discloses all subject matter claimed (refer rationale of claim 13) and teaches the devices and apparatus utilizing the methods (column 2 lines 47-50). However Krishnan et al. teaches the comprised means for the digital impairment learning sequence (Figure 3, and Figure 4): impairment compensator (10 Figure 4), means for organizing a received sequence, means for grouping the N phases; and means for selecting constellation points (132, 131, 11 Figure 4). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Krishnan et al.'s teaching in Okunev et al.'s devices/apparatus to implement the method to derive optimum transmit symbol constellations for a modem (Abstract).

Regarding **claim 22**, Okunev et al. discloses a transmit path communicating the constellation points to a remote communications device (column 2 lines 10-20).

Regarding **claim 28**, Okunev et al. does not specify the computer readable medium, however Krishnan et al. teaches the medium for the instructions (column 5 lines 3-10, 13-13A Figure 3) where the medium can be selected from the list cited in the claim as the inherence of the characteristics of the medium and the system configuration that does not show the uniqueness.

11. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okunev et al. (US 6272171 B1) in view of Krishnan et al. (US 6301296 B1) as applied to claim 20 above, and further in view of David et al. (US 6661847 B1).

Regarding **claim 24**, Okunev et al. discloses the constellation index is one of six constellations (FIG.1b, column 6 lines 6-7), but does not explicitly specify the phase intervals

number twenty-four. However Davis et al. teaches for each of the 6 intervals in constellation generation (column 7 lines 10-15) that includes +24. As Okunev et al. teaches PCM modem frame (six slots), at the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Davis et al.'s teaching in Okunev et al.'s optimal constellation method to map represented by digital impairment parameters between transmitted ucodes and received signal levels to select a set of signal constellations for downstream data (column 3 lines 27-30).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 703-305-3416. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4800.

Edith Chang
December 23, 2003

CHIEH M. FAN
PRIMARY EXAMINER